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MY CREST AND MOTTO.

'WHAT a wretched day!' said my wife one morning, looking out of window as I was about to start on my daily journey to London. 'I am so afraid, dear, you will get your feet wet walking down to the station. And there goes Mr Thompson in his new brougham. I am sure he only drives round this way to shew it off, for the Lower Road is much nearer.—Don't you think, dear,' she added, after a short pause, 'that you could afford to keep a carriage as well as the Thompsons? See how much time it would save you, and what a comfort it would be on such a day as this; besides, how nice it would be for me to drive down with Edith and baby to meet you when you come home.' I should explain that my house is about a mile from the railway station, in a district where cabs are unknown. In an evil hour, I yielded; and now commences the story of my troubles.

Accompanied by my wife, I visited a carriage-factory in Long Acre, when, after some deliberation on the respective merits of various descriptions of carriages, I became the possessor of a modest one-horse brougham. The bargain concluded, I was just congratulating myself thereon, when the carriage-builder asked, quite as a matter of course: 'Will you have your crest and motto on the panel, sir?'

For a moment I was struck dumb. Not to have a crest was to be degraded in the eyes of a coach-building mechanic. Quickly recovering myself, I told him I would let him know in a day or two.

'Why, of course we will,' said my wife as we were returning home: 'we will have your crest and mine quartered together.'

In the mildest manner possible, I ventured to hint that there might be some difficulty in procuring my armorial bearings; in fact, that I was not sure that I had any at all.

'What, Fred!' she exclaimed, 'a Howard, and no arms? Impossible! I am sure if papa had known it, he wouldn't have let me marry into a monogram.'

I deemed it imprudent to commence an alterca-

tion in which I was sure to get the worst of it; so, mentally determining to send at once my 'name, county, and half-a-crown,' as directed by the heraldic advertisements in the newspapers, I soothed my better-half by telling her I would look it up to-morrow.

With a certain feeling of humiliation, I enclosed thirty profile miniatures of our most gracious sovereign to the armorial advertiser, requesting him to inform me to what bearings I was the heir. In due course I received my patent of nobility. On a piece of paper about the size of a playing-card was a pen-and-ink sketch of an exceedingly attenuated animal, with an abnormal development of claws, tongue, and tail, climbing a ladder. And that there might be no mistake, the following interpretation was written beneath: *Ermine; on a Bend compony gules and azure, a Lion passant guardant or.* CREST: *A dexter hand coupé at the wrist appaumé proper.* MOTTO: *Quippi-ni?*

I was a happy man. My wife had not married into a monogram.

That day I had business which took me to Manchester. At the station I met an old friend who was just saying good-bye to his brother-in-law, also travelling northwards. 'How very fortunate,' said my friend, when I had told him my destination; 'you will have an agreeable companion all the way—a namesake, too—Mr Howard; my brother-in-law, Mr Howard.'

Before we had proceeded far on our journey, the similarity of our names formed the subject of our conversation.

'Are you a west-country or a Norfolk Howard?' asked my new acquaintance.

'Yorkshire, I believe.'

'Indeed! So am I. It is possible that we are related in some way. What is your crest?'

'A dexter hand coupé at the wrist appaumé proper,' I answered as readily as Garter King himself.

'Strange!' he replied; 'I always thought that was the crest of the Irish branch. The Yorkshire Howards bear a cockatrice or, watted gules, like this'—and he held out a signet-ring on which was

engraved a brute ugly enough to obtain 'honourable mention' amongst the antediluvian monsters in the gardens of the Crystal Palace. How I hated the man!

On my return to London, my confidence in the 'dexter hand' somewhat shaken, I applied to another professional heraldic searcher of the same class as the former. This gentleman must either have searched very diligently, or have had remarkably good fortune, for the same day I received a drawing representing a wretched-looking bird in a frightful state of moult, apparently attempting the juggler's feat of throwing up seven daggers at once. The explanation was given as follows: *Azure; semé de crosses-crosslet fichés or, an Eagle displayed argent, armed gules. CREST: A Sword erect or. MOTTO: Pro defensione coronæ.* Perhaps *Pro dimidio coronæ*, literally translated, would have been more appropriate.

There was evidently a mistake somewhere. What was I to do? In my perplexity, I applied to the College of Heralds. Having paid two guineas for a 'general search' without success, I was informed by one of the gentlemen attached to the office that he had no doubt he could trace my family, and that the expense would be 'a mere trifle—perhaps fifty guineas or so.' Not caring to spend so large a sum on the chance of obtaining what I wanted, I applied to an antiquarian friend for advice in the matter. He told me the best thing I could do would be to get a reading-ticket for the British Museum, and endeavour to find to which branch of the family I was allied. Acting on his counsel, I accordingly found myself, a few days later, turned loose in that vast literary paddock to graze at pleasure. On an attendant directing me to the particular shelves under the clock, sacred to Heraldry and Family History, I soon discovered the source whence my advertising acquaintances had procured their information. Their 'search,' I found, consisted in turning over the pages of *Burke's Armory*, though by what system of divination they elected from amongst the thirty or forty Howards there enrolled, I was at a loss to determine. Which of these was mine? Had there been but one, I should have been content to have adopted it; but here was an *embarras des richesses*. In a somewhat despondent state of mind, I again sought my antiquarian friend.

'There's no help for it,' he said, 'but to trace your pedigree back for about two hundred years from private sources, and then, possibly, you may find your family registered in the *Heralds' Visitations* in the Museum, in which case you are all right.'

Roused into activity by the difficulties before me, I determined to pursue the investigation with vigour. The first thing to find out was, who was my grandfather. I knew when he died; and old Court Guides shewed me that he lived for some years in Queen Anne Street; but where was he born, and when? I had heard that he came from the West-Riding of Yorkshire; so, provided with a Clergy List, I despatched letters to the clergymen in the district, asking them for information from their registers. The result was not altogether a success. One reverend gentleman regretted that he could not assist me, but enclosed a subscription-list for the renovation of his church; another wrote to say that, as a Christian gentleman, I had far better devote my attention to the future

than make idle inquiries into the past; seven or eight informed me that the legal fee for examining parish registers was one shilling for the first year, sixpence for subsequent years, and half-a-crown for every extract; another was grieved to say that the wife of a former clerk had cut out large circular pieces from the parchment leaves, extending over a period of nearly eighty years, for the purpose of tying over pickle-jars, and the period I wanted was included in that mutilated portion; while two were sorry they could find nothing, but enclosed claims for three pounds two shillings and sixpence and four pounds eighteen shillings respectively, for searching, with a request that I would forward the amount by post-office order.

'Why not try Doctors' Commons?' suggested my friend. To be sure, the very thing: so off I posted to that dreary, ill-favoured depository of last wills and testaments in Knight Rider Street. Having purchased an entrance-ticket in the shape of a shilling probate stamp, I went hopefully to work. Bitter disappointment, however, awaited me; for my grandfather's will, I found, afforded me no assistance. My father, and my uncle and aunts, were the only members of the family there mentioned; so I determined to search systematically backward. Another shilling enabled me to unearth another deceased Howard. 'Is this the one you want?' asked the attendant, when he brought the book containing the official copy of the will: 'George Howard, Citizen and Lorimer of London.'

'I can't tell,' I answered, glancing over the will, 'unless I see whether he had a son called Francis, in which case perhaps'—

'No, no: you don't come that, you know,' he politely rejoined, laying his grimy hand over the page: 'if you want to read it, you must stick to it.'

The expression of my face probably told him that I did not understand this extraordinary proceeding; for in a milder tone of voice he continued: 'You see if a person gets the wrong one, he may have another on the same ticket; but if he reads it, he must pay for it.'

'And how many can I see on those terms?'

'Two. But after the second fee, you can have three; that is, supposing you don't read 'em. If you do, they are a shilling apiece for any number.'

I determined to read the document before me, and while so engaged, suddenly remembered an appointment I had made for the following day; and that it should not escape my memory, made a memorandum in my pocket-book. In a moment, a zealous official pounced on me like a hawk. 'Here, I say,' he screamed, 'you mustn't do that, you know.'

'Mustn't do what?' I asked in astonishment.

'Make extracts. If you want a copy, we'll do it for you at sixpence a folio, that's seventy-two words; but you mustn't do it yourself.'

That day I invested nine or ten shillings, and got nothing in return. I almost began to fancy that my grandfather must have received his baptismal and patronymical names at the hands of the beadle of the Foundling Hospital.

At length, after much patient inquiry, I learned from a maiden aunt that my doubtful progenitor was born in Leicestershire, and only went to Yorkshire to serve his articles to a solicitor. This time,

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parish registers served my turn. I received a very courteous reply from the clergyman, and a number of extracts which furnished three more complete links in my ancestral chain. The worthy rector concluded his letter by saying that the tomb of my great-grandfather was in a very dilapidated state, and expressed a hope that since I took so much interest in my family, I would not allow my ancestor's last resting-place to fall to decay when twenty pounds would restore it. He also intimated that there were several of my cousins in his parish—legally entitled to the same arms as myself—for whom an occasional sack of coals would be an acceptable present.

So far, so good. I found that my grandfather with three *greats* died in 1690, but as yet I had no clue to my 'Crest and Motto.' It was very annoying; here I was just one generation short of the *Heralds' Visitations*. As a last resource, I determined to try my fortune once more at Doctors' Commons. I was told on a former occasion, by a fellow pedigree-hunter, that for the purposes of 'literary research,' wills prior to the year 1700 might be examined free, on obtaining a ticket from the judge of the Court of Probate. I wrote accordingly for the requisite order, and received a letter in reply informing me that that department was closed for a few weeks, but that in due course a ticket should be forwarded. At length I received the long-expected order; and at ten o'clock on the day appointed for the reopening of the literary room, I presented myself for admission. A messenger, to whom I stated my errand, told me that department did not open until eleven; so for an hour I paced up and down between the depository for Testaments and the new Bible-house, at the corner. (There are eighty-five flag-stones between the two places, and they are just a convenient width to enable one to tread on each stone without touching the cracks.) At eleven, I again applied for entrance, and after waiting for some time in the hall, was fortunate enough to meet with a messenger.

'It will be all right, I daresay,' he answered in reply to my inquiry; 'but we don't begin till eleven, you know.'

'Just so; but it's a quarter past now.'

'Well, sir,' he rejoined in a deprecatory tone, 'you can't expect us to begin sharp to the minute. If you will wait a little, I daresay Mr —' [the superintendent of the room] 'will be here.'

I accordingly waited for about half an hour, and growing somewhat impatient, ventured to ask how long Mr — would probably be.

'Well, if he isn't here by twelve or one, I don't suppose he'll come at all to-day, because we close at half-past two.'

The answer had the desired effect; for I left immediately, and allowed the messenger to read his newspaper in peace.

A few days afterwards, I tried again. It was about one o'clock. 'Quite right, sir; but the room is full at present. We never allow more than three persons in at the same time.'

Again I made the attempt, and at last successfully. On searching the Calendar, I found the wills of several Howards, but not the one I required; so, like young Oliver, I asked for more. 'Not to-day, sir; you have seen ten. If you will come to-morrow—no, not to-morrow; we are closed on Saturdays—on Monday, you can see ten more.'

For the fourth time, I returned to the attack; and my perseverance was at length rewarded, for I had the happiness of finding the will I wanted, which contained the names and places of residence of the testator's father and children. On referring to the *Visitations* in the British Museum, I found, to my inexpressible joy, that my pedigree was therein recorded, and not my pedigree only, but my ARMS, CREST, and MOTTO.

Need I add, that the panels of my brougham are decorated with neither a *dexter hand* nor a *sword erect*?

WOMAN IN THE MIDDLE AGES.

THE learned author of *Domestic Manners and Sentiments during the Middle Ages*, *The History of Caricature in History and Art*, and other like volumes, has recently given to the world a history of the gentler sex in Western Europe.* Mr Wright is equal to the task, and is wise in confining himself to the division of mankind to which we belong. One of the most interesting parts of the volume is the picture of woman's life in the feudal castle, which has only been briefly attempted by other writers, but which, as Mr Wright remarks, has contributed more than anything else to the formation of her character in modern society. Our author is thoroughly at home among illuminated manuscripts, quaint chronicles, ivory carvings, embroidery, in short anything which can shed a ray of light on the so-called 'dark ages.'

To shew the excellent domestic character of the Roman women of an early period, it is only necessary to state, that although the Roman husbands had almost unlimited power of divorce, the first occasion on which it was exercised is said to have occurred five hundred and twenty years after the foundation of Rome. At the time of Caesar's invasion here, social life among the Britons was at a very low ebb; and, if we are to believe him, the natives wore no clothing, merely dyeing their bodies blue. Roman costume was, however, soon adopted in this country. The Romano-British lady wore the tunic, *stola*, and the *palla*, just as the Roman ladies of Pompeii wore them; and the female personal ornaments now often discovered are all Roman. A sepulchral monument discovered at Ilkley, Yorkshire, commemorating a family named Olicana, and a statue found at Chesters, Northumberland (the site of the Roman station of Cilurnum), shew well the costume at this period. The inscriptions on the few sepulchral monuments found sometimes exhibit touching affection. At Carvoran, a Roman site on the line of the Wall, Aurelius Marcus, a centurion, erected a monument, as a testimony of love for 'his most holy wife, who lived thirty-three years without a single stain.' A woman is frequently spoken of in Anglo-Saxon poetry under a word meaning 'a weaver of peace.' At first, the patri-

* *Womankind in Western Europe, from the earliest Times to the Seventeenth Century.* By Thomas Wright, M.A., F.S.A., &c. London: Groombridge and Sons, 1869.

archal spirit existed in full force among that people, the father being absolute master in his family, disposing of his children at will. He sold his daughters, the price being generally so many head of cattle. Their feelings were seldom consulted. Even when Christianity was introduced, it was no uncommon thing for a father to dedicate one of his daughters to a monastic life when she was a mere child.

The early marriage-ceremony among the Anglo-Saxons was of a very primitive character: it consisted merely of hand-fasting (*hand-fæstung*), or taking each other by the hand, and pledging love and affection, in the presence of friends and relations. The bridegroom paid the father a sum of money, called a *foster-lean*, or payment for nourishing. At a later period, the early custom of espousals was reduced to a regular system, and the lover was required to give a *wed*, or security for the performance of his contract; hence our word *wedding*. Under the influence of Christianity, the bride was allowed to have a voice in the contract, and break off the contract before her tenth year; and the father had not to return the money paid by the lover. If the lady wished to refuse before her twelfth year, the father had to return the money, or pay a fine. By this means, a father could espouse his daughter to several lovers, obtaining their money, and persuading her to cancel the contract. The church soon saw the impropriety of this, and ordered a girl who had refused the husband provided for her, to retire into a convent. Rather a harsh measure. The clergy soon introduced more formalities into the marriage-ceremony. The Anglo-Saxon bridegroom put a ring on the maiden's right hand at the espousals, which, at the marriage, was removed to her left, on the first finger. The father at the same time delivered the bride's shoe to the bridegroom; and the latter touched her on the head with it, to shew his authority. This ceremony is still preserved now in the popular custom of throwing shoes after a newly-married couple. It has been supposed that the gift of the shoe had its origin in that of placing the foot on the neck of a prisoner or slave. The morning after the marriage, the husband presented the wife with a valuable present, called the morning-gift; and in later times, the amount was stipulated before the ceremony. At the close of the tenth century, the Lady Wynflæd left an estate to a relation, which she states had been her morning-gift. When Athelstan's sister, Eadgith, married Otho, Emperor of Germany, he gave her the city of Magdeburg as her morning-gift.

If a widow married again within a year of her husband's death, she forfeited everything she had received from him—the origin, doubtless, of our feeling that a widow ought to wait a year before marrying again. Mr Wright points out that the position of women under the Danes was comparatively good. A woman had actually a right by law to the custody of her husband's keys. The Anglo-Saxon females were very industrious; and the whole process of the construction of clothing was entirely in their hands. The Penitential of Theodore of Canterbury (seventh century) forbids women to sew clothes, card wool, or shear sheep on Sunday. William of Malmesbury says that the daughters of King Edward (successor of Alfred) employed themselves in the labours of the distaff

and the needle. The Normans were much struck with the beauty of the Saxon needlework, which was called, by way of distinction, '*Anglicum opus*,' or English work. According to *Doomsday Book*, Alwyd, a damsel, held lands at Ashley, Bucks, given her by Earl Godwin for teaching his daughter gold embroidery.

According to Adhelm, the Anglo-Saxon women loved to deck themselves with rings and bracelets, curled their hair, and dyed their cheeks with stibium. The manuscript illuminations which have come to us shew the women clothed in a very modest manner; in fact, only the face and hands appear to be uncovered. They wore the *camisia* next the skin, then the tunic, the *cyrtel* (kirtle), and over all a mantle like the Roman *palla*. The head was covered with a head-rail, as it was called. In many manuscripts, the hair is painted blue, and it is probable that both men and women dyed their hair. Before marriage, a girl wore her hair long, hanging down; but after, it was cut shorter or bound up. Gloves and stockings were worn by both sexes; the term hand-shoes (*hand-sceo*) was applied to the former. The head of a family was often called *hlaf-ord*, the origin or source of the bread; his wife, *hlaf-dig*, the distributor of the bread; and his servants and retainers, *hlaf-etas*, or eaters of the bread.

According to the ecclesiastical Anglo-Saxon laws, the bishops gave the right to divorce; and marriage was not permitted within the fifth degree of consanguinity—a ridiculous rule, frequently set at naught. The clergy of the old school then had their wives, though this was altered by Dunstan at a later period. The convents were frequently places of luxurious living, to say the least. Mr Thrupp, in his *Anglo-Saxon Home*, page 231, gives this description of the lady abbess of one of these establishments: 'She appeared in a scarlet tunic with full skirts and wide sleeves and hood, over an under vest of fine linen of a violet colour, with shoes of red leather. Her face was rouged, and her hair curled with irons over the forehead and temples; ornaments of gold encircled her neck, heavy bracelets adorned her arms, and jewelled rings were upon her fingers. Her nails were worn long, and cut to a sharp point, to resemble the talons of a hawk.'

After the death of Charlemagne, came the terrible invasions of the Northmen, and to withstand this, the *feudal system* arose. This consisted in granting lands on condition that the tenant should perform military services to the crown, according to its extent. In the tenth century, the whole landed property of France passed into this sort of tenure. Almost impregnable fortresses arose, and the castle became the symbol of feudalism. Isolated from the world, the male part of the household were only too glad to go forth to seek adventures. But, notwithstanding this, never in any other form of society, says M. Guizot, has a family reduced to its most simple expression, husband, wife, and children, been found so closely drawn together. When the lord left his castle, his lady remained as mistress, which often gave to women of the feudal epoch a dignity, courage, and virtues which they would not have displayed in any other circumstances. This solitary, sombre, castle life was favourable to the development of domestic life and the elevation of woman. In the eleventh century, the spirit of family, domestic life had

acquired a development and empire previously unknown. Dress was comparatively simple in the reign of the Conqueror, and when extravagance is mentioned, the men incur the blame.

Ladies became frequently nobles in their own right, conveying their vast estates by marriage into other families. When married, such a dame occupied a high position in the household, sitting in the place of honour beside her lord at the table, and taking his place when absent. It was the general custom for the lady of the castle to go to the gate to receive a visitor. It was not considered courteous in her to retire to array herself when he was announced. The knight of La-Tour-Laudry urges that 'all women should come to receive their friends in the state in which they happen to be.' When a guest departed, the lord and lady of the castle conducted him to the gate.

Sons of the vassals were sent to be educated in the castle of their suzerain, and were called *damoiseaux* (*damoiseil*, a little lord); and the daughters (*damoiselles*) were similarly placed with the lady of the castle, and attended on her, and were called *chambrières*, or chamber-maidens. They were taught to behave themselves demurely and modestly; and several of the codes of instruction are extant. Two words, never to be forgotten, arose out of the condition of society in the feudal castle—*courtesy* and *chivalry*. The first of these meant the manners and sentiments prevailing in the household, for every baron's household was a court. Courtesy distinguished the society inside the castle from the people outside. A poem of the thirteenth century thus expresses the source of courtesy:

There is reason enough why
We ought to hoid woman dear;
For we see happen very little
Courtesy, except through women.
Well know I that for the love of the ladies
The very clowns become courteous.

The word *chivalry* we owe to the influence of womankind on feudal society. The feeling of devotion to the fair sex was called *chevalerie*, the duty of the *chevalier*. The spirit of gallantry had made its way from the South, and the knight looked upon woman as his patron, and considered himself bound to offer himself in her defence. At joust and tournament, the presence of ladies encouraged the knights, who wore their favours (generally a richly embroidered sleeve), and received the prizes from their hands. At the tournament in Paris in 1389, the ladies met after supper each day and adjudged the prize of valour. A successful competitor was often allowed to kiss the fairest of the ladies present.

Not content with this, a fair *demoiselle* of rank and wealth sometimes offered herself as the prize of the tournament. Guarin de Metz in this manner won the hand of the fair Melette Fitz Warine and the manor of Whittington to boot.

The greatest accomplishment a young bachelor could possess was the art of composing love-verses upon his lady. This knightly love-poetry formed a large portion of the literature of the middle ages, and much of it is preserved. Sometimes, when a lady had a husband she did not like, she got another knight to challenge him, and, if successful, accepted him as her lover.

But notwithstanding the external pomp and pride

of the medieval castle, Mr Wright's facts prove that the degree of morality was not very high. Illegitimacy of birth was hardly considered dishonourable. The first of our Norman kings was William the Bastard, and one of the most distinguished of the romance heroes was in similar plight.

Ladies are represented in illuminations more frequently spinning thread than in any other occupation. During the feudal period, property which went in the female line was said to descend to the *quenouille*, or distaff; hence our word *spinster* has become the legal designation of a woman who has not been married, spinning then being looked upon as unmarried woman's chief occupation. In Queen Mary's Psalter in the British Museum, Eve is represented spinning in Eden. Curiously enough, the medieval ladies were the physicians, and often surgeons of the household. Their skill in these professions is often mentioned in romance literature.

The day in the castle began at sunrise, and ended about eight or nine o'clock in the evening, when the household usually retired to rest. The two chief meals of the day were *dinner*—about the middle of our forenoon—and *supper*, which was taken about four or five o'clock in the afternoon. At a later period, the hours became much later, and a second supper, called the *re-supper*, was eaten. After dinner, knights and ladies sat round the table in the hall, or adjourned to a chamber near, listening to the songs of the minstrels, or playing at games, or *gabbing*. The last amusement was derived from the old northern races, and consisted in uttering extravagant boasts of the feats which each had done, or could do, and passing satirical jokes upon others. The word *gabban*, in Anglo-Saxon, means to joke or jeer, and a good gabber was a great acquisition in feudal society. In the fourteenth century, sarcastic characters were drawn upon rolls of vellum, with marks attached to each, and each drew one by chance. A like custom was kept up in the Elizabethan period in the roundels, or fruit-trenchers which were turned up after the fruit or confectionery had been eaten, and the satirical motto was supposed to apply to him or her who found it. The medieval ladies were passionately fond of dancing and games of skill, especially to tables and chess. The former was like our backgammon, and was of great antiquity. *Draughts* (or, as it was then called, *dames*) was also played. Instruction in chess was always considered part of a liberal education. Both sexes delighted to escape from the castle into the garden, or into the fields beyond. The garden was often extensive, and adorned with fountains, and was usually placed so that easy access could be had from the apartments of the ladies to it. The people of the middle ages had a great taste for singing-birds and pet animals, though the cat must not be reckoned among these. The favourite bird for the cage was the pie or magpie. Many stories of its skill in talking are told in the romances.

Feudal ladies of the higher class were very careful in keeping their inferiors at a respectful distance, and the rules of behaviour were very formal. Ladies and gentlemen when walking out held each other's hands, never arm-in-arm. In riding, ladies frequently, like the Wife of Bath in Chaucer's *Canterbury Tales*, rode astride like men. When sitting sideways on the horse, a lady, in illuminated manuscripts before the sixteenth century, is always represented sitting with her legs on the right side

of the horse, with her left hand towards its head, exactly contrary to the way in which ladies ride now. At an early period, mules were in favour, but as the age of feudalism advanced, ladies took to the palfrey. Carriages or chars were seldom used, and were clumsy and inconvenient. When Richard II. was reconciled to the citizens of London, and entered London, two chars of court-ladies were in the train of the queen. One of these was overturned, as Richard of Maidstone exultingly tells us, as he looked upon it as a judgment of Heaven for such extravagance as the use of chars. Hawking was considered quite a lady's accomplishment; and the earliest treatise on hawking and hunting written in the English language was by Dame Juliana Berners, Prioress of the nunnery of Sopewell, near St Albans. John of Salisbury, in the twelfth century, tells us how eagerly ladies followed the sport.* They were also very fond of hunting the hare, hart, wolf, and bear—the four beasts of *venerie*, or hunting. A hound like our modern one was used for hunting these animals, the hare, and sometimes a deer also, being pursued with a greyhound. Spaniels were used in hawking. In manuscripts, ladies are represented frequently shooting or ferreting rabbits. Mr Wright says the use of the ferret for this purpose is of great antiquity. Pliny (*Hist. Nat.*, lib. viii. c. 81) speaks of it as common among the Romans in Italy. An act of 13 Richard II. prohibits any priest or other clerk not having a benefice of ten pounds yearly value, to take rabbits with ferrets, under a penalty of a year's imprisonment. The Italian clergy were in the middle ages very fond of this amusement. An illumination in Queen Mary's Psalter represents a lady placing a ferret in a rabbit's hole. The books of the middle ages shew that hawking was considered quite the province of the ladies. They even carried them into churches; but this we cannot wonder at, when we find that ecclesiastics of rank and position adopted the fashion themselves, though this was condemned by the stricter among them. The merlin was the ladies' hawk, and the hobby that for a young man. The hawking season began with the month of August, and the ladies rose early and sought partridges about that month.

The perfumes used by the medieval ladies were not of a very refined nature—saffron appears to have been the principal; and mercers sold frequently 'wimples perfumed with saffron.' Ladies soon came to be distinguished for extravagance in dress; and fashions changed with great rapidity. Chaucer's *Persones* inveighs against the wild extravagance of contemporary fashions in dress. Mr Wright points out that there was no *law* of fashion, but each high dame seems to have chosen her fashion for herself, though at any particular period a general character prevailed. The whole extent of feudalism formed, in some respects, one great domain, in which each feudal castle was a sort of little state, complete in itself. At certain times, the ladies of these castles went to the king's court, and saw variations and peculiarities in dress, which they carried home, to introduce into their own lesser court. The dresses in the thirteenth century were

often made of rich materials, richly embroidered. Gloves were generally worn; and it was considered the height of ill manners to keep the gloves on the hand during visits, or in soirées, or in balls, or in the presence of great people, and when two persons met in the public road, they drew off their gloves before touching hands. The hair, at the end of the thirteenth century, was arranged so as to project above the ears on each side. False hair was added, called *atours*, and this assumed the form of horns, which excited the indignation of the satirists of the period. The Knight of La-Tour-Laudry (c. 1371) tells us of a bishop who, preaching to ladies thus dressed, told them that Noah's flood was brought on by similar vanities, and that he had no doubt that the Demon made his ordinary seat between the woman's horns.

There was a great difference of opinion in the middle ages as to whether a knowledge of letters was good for the female sex or not. It generally happened, however, that the ladies of the knightly household were the most learned part of the family. They appear to have excelled in literary composition. The Provençal poets counted among their ranks a number of poetesses, the most distinguished of whom lived in the twelfth century. Marie de France was a poetess of great reputation in the thirteenth century. She acknowledges as her patron our King Henry III. She wrote a collection of love-tales, professing to be derived from Breton legend, and another work consisting of a number of fables in Anglo-Norman verse. In the latter volume she says she was induced to do it by 'the Earl William,' who is supposed to be the celebrated William Longue-épée, Earl of Salisbury, son of Henry II. by Fair Rosamond. The great poetess of the fourteenth century was Christine de Pisan, daughter of an eminent physician in Venice, who settled in Paris at the invitation of Charles V. At this time, 1368, Christine was only five years old. She received a learned education, and while still young, married a gentleman of Picardie, named Etienne Castel. In 1396, she was well known for her poetry. Her husband died in 1402; and she had to support her five children, being probably the first woman who, in Western Europe, sought to live by her pen. She tells us, in 1405, that she had already composed fifteen principal works, without reckoning her smaller and more playful writings; that is, the poems of various kinds composed in her youth, which, altogether, she says, 'filled seventy quires of a large volume.' She appears to have made copies of her writings also. One of her presentation copies is preserved in the British Museum, and is richly illuminated. It was written in 1404, for presentation to Isabelle of Bavaria, queen of Charles VI. At the head of the prologue is an illumination representing Christine presenting her book to the queen. In 1405, Christine presented herself as the champion of peace, and wrote a letter to the queen, entitled 'The Weeping Request of Loyal Frenchmen.' The peace of Vincennes was concluded soon after, but did not last long; and Christine composed her *Lamentation*. Soon after, she retired into a nunnery, where she remained eleven years, until the appearance of the Maid of Orleans, in whose praise she composed a poem, a copy of which was discovered by M. Jubinal among the manuscripts of the library at Berne, and published by him in 1838.

* He alleges as a proof of the frivolous character of hawking that the 'less worthy' sex was the most skilful of the two in bird-hawking, which, he says, we might make an accusation against Nature herself that 'the less worthy are always the more prone to rapine.'

The remaining three or four chapters of Mr Wright's book are devoted to a later period, namely, the transition from feudalism, and the sixteenth century.

LIFE IN THE STEERAGE.

IN FOUR CHAPTERS.—CHAPTER IV.

THE joy with which we hailed the occurrence of the most trivial event promising a break in the dreary round of daily life, cannot be comprehended by dwellers on shore. Such events were, however, few and far between. I shall never forget the excitement that pervaded the minds of all when, on this miserably dull afternoon, the welcome cry was raised of 'A sail on the port bow.' Not a ship had we seen since leaving the Channel, and now all rushed on deck, effectually roused out of the prevailing apathy, to catch a glimpse of the stranger. She was hull down, and only as our ship rose on the tops of the long swells could we just see her topsails. In an hour or two, we were near enough to perceive she was a bark, and presently we ranged alongside, within a quarter of a mile of her. Under topsails and staysails only, and not a stitch of canvas on her mizzen-mast, she was labouring heavily; now tossed aloft, till we could see the green tarnished copper under her bows, again rolling in the troughs of the seas, her decks plainly visible as she heeled slowly over. From the comparative rapidity with which we left her astern, ourselves only going some four and a half knots, it was evident that she was not even holding her own, but drifting fast to leeward. No signals were made, and we watched her until she was again hull down; indulging the while in idle speculations as to her identity and port of destination. The sight of a sail is always welcome; but it is seldom that ships approach one another closely enough to allow of any communication being held of a more intimate nature than an interchange of signals, by means of flags by day, or rockets at night; this last only in the case of steamers. Once or twice we were aroused during the night by the news that a steamer was in sight, and hurrying on deck, watched with much interest the flight of rockets which told to their respective captains the line to which each ship belonged.

One afternoon, when within a couple of days' sail of the Banks, an accident befell, which, while it threatened to lengthen the voyage, gave us what we so greatly needed, a little passing excitement. In the face of a heavy sea and an adverse wind, the *Parahyba* was slowly forcing her onward way, under just enough canvas to steady her, when suddenly, without any previous warning, the engine stopped, and she broached to, giving two or three tremendous rolls as she swung round and fell into the troughs of the huge waves, which, mounting up high above us, seemed threatening to overwhelm us at each moment. The captain was below at the time; but, rushing on deck, he gave a few sharp, decisive orders, and quickly had the ship once more under command. On inquiry, it was found that the piston-rod of the engines had snapped, with the effect, of course, of instantly stopping the ship's way. The smith's shop was at once rigged, and all available hands set to work to repair damages. One or two of the mechanics in the steerage volunteered their services, which were accepted; and

after twenty hours' hard work, steam was once more got up. During this interval, we were making leeway, as, in the teeth of the wind then blowing, it was impossible to make the ship keep her course; and the voyage was thus lengthened by at least twenty-four hours; no trifling delay in the estimation of persons who were anxiously counting the days that must be got through ere the much-desired land could be reached.

Most things, however, come to an end sooner or later, and so it was with the bad weather which hitherto had retarded our advance. After the breakdown just recorded, our affairs improved; at length we were favoured with a fair wind, in due time reached the Banks, and henceforth our progress was satisfactory. Passing through a whole fleet of the fishery-vessels, many of them within hail, and, for a wonder, unimpeded by the fogs so prevalent in this part of the Atlantic, we entered on a region of light winds and calm seas; and now came the only enjoyable part of the voyage. The weather was pleasantly warm, and a succession of bright calm days brought even the foreigners willingly upon deck, where they tumbled about after an ungainly fashion. After seeing great lubberly fellows in blouses and trousers with pockets capable of receiving a month's supply of provisions, crawling about a ship's decks on all-fours, let there be never so little swell on, one ceases to wonder that Englishmen should rule the seas with a sway so absolute. The only foreigners on board who did not display an aspect of abject misery from the beginning of the voyage to its ending were a party of Swedes, who, by the way, were to a man tailors. These men walked the deck in all weathers; and in this emulated the hardest Englishman in the ship, and set an example to the representatives of the other continental nations, which the latter were slow enough to follow. When about five days' sail from New York, a visitor in the shape of a hawk came aboard. Settling on the fore-topsail-yard, he rested for a while, then again taking wing, he circled round the ship, and swooped on an unlucky Mother Carey's chicken, which he brought on board to devour. Another and another of these pretty birds were sacrificed to his appetite, after which he again took up his quarters on the yard, and apparently went to sleep. Whether he had escaped from some ship, or had been blown off the land, we were at a loss to determine. At night, one of the cabin passengers went aloft, and secured him, after a good deal of screaming and struggling. He was kept alive, and subsequently taken ashore by his captor at New York. It now began to be whispered that the pilot might be taken aboard any day; and the carpenter was set to work to make a new accommodation-ladder for his reception.

As is customary on outward-bound ships, sweepstakes were got up, promoted by the mates and other officials, in which the passengers were allowed to join. These are regulated as follows: There are about twenty-two pilot-boats attached to the port of New York, each of which bears a distinguishing number, displayed on her mainsail. The numbers range from one to twenty-two. A certain number of members, on payment of, say, one shilling each, draw for the numbered tickets; and the holder of the number which appears on the sails of the boat that reaches the ship first, of course wins the sweepstake. The sweepstake got up in our berth was managed by the second and

third mates; and the latter subsequently proved the holder of the winning ticket.

In the forenoon of the twentieth day, a small white speck was descried on the verge of the horizon, on the port bow, and by the initiated was pronounced to be a pilot-boat. In an hour, we were near enough to observe that she was lying to, waiting for us, and at noon we were almost within hail of her. We all crowded on the fore-castle to gaze at this the first specimen of Yankee naval architecture we had seen; and there, hove to, distant about a quarter of a mile from our ship, lay a rakish-looking schooner, round sterned, coppered, and with lines almost as fine as those of an English yacht. Her boat was quickly lowered; a pilot and a couple of rowers took their places, and pushed off, pulling across our bows, when they rested until we were fairly abeam of them. The side-ropes were now manned, and the pilot was quickly on deck, where he was received by the skipper with much apparent cordiality. He brought with him the latest copies of the New York journals, but these were only for the fortunate occupants of the saloon, who were immediately to be observed eagerly scanning their contents.

In default of anything more amusing, we of the steerage criticised the outward man of our pilot as he stood, conversing with the captain, on the saloon deck. In his appearance and attire, there were no indications of the seafaring man. Dressed in a gray coat and trousers, white vest and pot hat, he seemed to us to present the appearance of a well-to-do Englishman of the middle classes, rather than to conform to our preconceived notions of a Yankee seaman. However, there he was; and, a little disappointed with our scrutiny, we turned to observe the manoeuvres of his schooner, which by this time was a good way astern. The jib-sheets hauled over, her helm put down, she went about like a top, and staying a few minutes to pick up her boat, sped rapidly northwards in the prosecution of her cruise, and was soon once more a mere speck on the horizon.

The same night, after dark, another pilot-craft hove in sight, and made signals to us. We passed her within half a mile, her white sails looking spectral in the moonlight. She was lying to, awaiting our approach, but on the display of a light in our mizzen-chains, signifying that a pilot was on board, she at once resumed her course, and was quickly lost to view.

These boats, smart craft all of them, though not equal to those of our own waters, cruise about in the track of outward-bound ships, each of them having several pilots on board. They are all schooner-rigged, about fifty tons' burden, and of necessity good sea-boats, running out as they do often upwards of five hundred miles in quest of vessels.

When within a certain distance of port, the pilot takes charge of the ship, which the captain resigns entirely to his control, and from thenceforth the former is, to all practical purposes, the commanding officer. If, however, a captain has good reason to think the pilot is not performing his duties efficiently, he is justified in resuming command of his ship, though this does not occur very frequently, as the pilots are all good seamen, and men able to work a ship in proper style. The same pilot who takes a vessel into port also, as a rule, brings her out on her return voyage.

The pilot aboard, we began to anticipate a

speedy termination to our miseries, hoping, in another day or two, to make the land. The following day, which was Saturday, we began to sight other vessels, principally specimens of the fore-and-aft rigged craft so much affected by our transatlantic cousins; and by-and-by the horizon was dotted in all directions with white sails. Floating masses of sea-weed and flights of birds also indicated our approach to the shores of the New World, whilst the air grew sensibly warmer as we advanced.

At length, on Sunday, as we were sitting down to what we fervently hoped would be our last dinner on board, the welcome cry of 'Land!' was raised, and, rushing upon deck, we beheld, looming dimly on the starboard bow, the low-lying shores of Sandy Hook. Dinner was dismissed, and summarily; beef and pudding had now no charms for us; and we remained on deck, gazing on the long-desired shore of America, and regardless of all other things. In due time we were passing through the Narrows, as the point where the shores of Staten and Long Islands approach each other is designated, and at three o'clock we dropped anchor off the Quarantine Station. Every one was now ordered on deck, the steerages were fumigated, and the hatches were closed. Presently the doctor came aboard, and we were all mustered aft for his inspection. This farce over, and the bill of health found to be satisfactory, the ship was allowed to proceed; and very soon we again anchored, this time opposite the government dépôt at Castle Garden.

The custom-house officials now came off in their steam-tug, on which, as on everything belonging to the Yankee government, the American Eagle was ostentatiously displayed. The cabin passengers were allowed to go ashore, of course without their luggage; but we poor devils in the steerage had perforce to content ourselves with a distant view of the buildings in New York and Jersey City, and to extract such entertainment as we could from the ferry-boats and numerous river-craft. And now our troubles nearly over, we, my two friends and myself, congratulated each other on our approaching escape from the den in which we had been confined for so many weary days. Words cannot describe the delight we felt in the prospect of resuming the habits of civilised life, to which we had so long been utter strangers. Let the reader in imagination place himself in our position. Let him imagine himself withdrawn from his own sphere of life, highly respectable, no doubt, and immured in the *Parahyba's* steerage, constantly surrounded by unwashed Englishmen, slatternly women, squalling children, and filthy foreigners. Let him realise, if he can, the delights of regaling on dubious beef, indifferent potatoes, and hard biscuit, served up in tin ware, and eaten off plates of the same elegant material, with three-pronged forks and knives of the most primitive make. Let him fancy himself drinking muddy coffee and birch-twigs tea, alike guiltless of milk, and almost innocent of sugar, out of a tin pannikin devoted to divers other purposes; sleeping by night on a chaff mattress, destitute of sheets, and covered with one so-called blanket, tormented by fleas, and at all times apprehensive of the possible advent of still less desirable members of the entomological tribe. Let him further picture himself wetted with rain, and day after day drenched with salt water, without the possibility of obtaining a change of

garments, or the means of drying his clothes, unable also to change his linen or to indulge in the luxury of a thorough personal ablution. If he can fancy himself undergoing all this, not for a single day, but for upwards of three weeks, he will be able to enter into our feelings as we gazed on the scene around, and rejoiced in the prospect of emancipation.

Next morning, we were astir by four o'clock, making our preparations to disembark; the luggage was got up from the hold, in due time searched by the custom-house officers, and discharged into a barge alongside. We were transferred to a steam-tug, which landed us at Castle Garden, early in the forenoon, not, however, free as yet to separate to our various destinations. Every steerage passenger who lands in New York, whatever may be his business in the States, profession, calling, or object in coming to America, is regarded as an emigrant, and incapable of protecting his own interests. The government *dépôt* at Castle Garden was established some years ago for the avowed purpose of protecting newly arrived and ignorant emigrants from the rapacity of the low boarding-house keepers, whose touts or runners, as they were styled, haunted the landing-stages, and pounced upon unwary steerage passengers as they came ashore, bearing them off to dens where they were quickly plundered of everything, money, clothes, and effects of all kinds. In addition to this, the establishment was designed to assist emigrants to obtain employment, to facilitate their transference to various parts of the States, and, in short, to further their intentions and interests in every possible way. To carry out these objects, a large staff of officials is maintained, and the cost of the establishment is defrayed by a tax levied on the different shipping companies of two dollars per head on every steerage passenger landing in America for the first time. All boarding-house keepers permitted to enter the *dépôt* are provided with a badge, and this can only be obtained by persons of known good character. They must also state on their cards their charges per day and per week; and to the rates thus advertised they are bound to adhere, under penalty of confiscation of their privileges. Without quitting the premises, emigrants can obtain refreshments, can telegraph to their friends, post letters, or buy rail or steam-boat tickets to any part of the States. The authorities also, on payment of a fee of forty cents (1s. 8d.) per package, convey luggage to any part of the city by means of express cars, attached to the establishment. Emigrants may remain in the building—where, however, there is no sleeping accommodation—until they obtain employment or leave New York. Boxes and other articles of a bulky nature are warehoused for a certain number of days free of cost. As the luggage of each passenger is searched on board ship, he receives a metal check, bearing a certain number. A corresponding check is attached to his box, and on presenting the duplicate at the *dépôt*, he is allowed to take possession of his property.

The above is a brief description of the advantages offered by the establishment. Now for the practical working of the system. On landing from the steam-tug, we passed at once into the precincts of the *dépôt*, at the gateway of which we were stopped by an official, who, singling out at a glance the English from the foreigners, separated us into two parties. After waiting a little while, we

passed up a narrow passage one by one, each, as he approached a desk, at which several clerks were writing, being asked his name, age, whether he had been in America previously, what part of the States he was going to, &c. The answers elicited were carefully noted down; and as each left the desk, he passed into a part of the building railed off from the rest. The principal room, in which we now were, was in past days a place of public entertainment; and here Jenny Lind made her first appearance in New York—at least so I was informed. A clerk now proceeded to call out the names of those persons whose friends had arrived to meet them, and also for those for whom letters were waiting. This done, he proceeded to inform us that work would be offered to all who chose to take it, before they left the premises. We were now at liberty to go, either to the labour-market, which is situated just outside the large room, or out of the building altogether, we being now free of the city. Many of my fellow-passengers accepted employment of various kinds that was offered to them by masters and others who avail themselves of the facilities for obtaining workmen afforded by the Castle Garden labour market. Others at once left New York, *en route* for various cities and towns of the Union. My two friends remained in the city for a couple of days, when they too left, to proceed up the country; and with mutual expressions of good-will, we parted, in all human probability, to meet no more.

In thus recording my personal experiences as a steerage passenger, I have been careful to 'nothing extenuate, nor set down aught in malice'; my aim being to produce a faithful picture of life as it presents itself to thousands of those 'that go down to the sea in ships' in the course of each year; I have simply recorded bare hard facts as they came under my own observation. If the information contained in this article should happily prove of service to any intending steerage passenger, I shall not have written in vain. As my readers will perceive, life at sea is sternly prosaic, and every one who purposes to cross the Atlantic as an occupant of the lower deck of an emigrant ship, must be prepared to undergo many unpleasantnesses and to encounter many hardships. Despite the ameliorations that have of late years been effected in the condition of steerage passengers, there is still much room for further improvement; and I cannot think it right that, for the gain of shipping-owners, human beings should continue to be herded together like so many head of cattle, to the total disregard of the common decencies of life.

SMALL CHEAP RAILWAYS.

THE enormous and sometimes misapplied outlay on railways, leads to the consideration whether something sufficient for a moderate amount of traffic in outlying quarters might not be attempted at an inconsiderable cost. While people are speculating over the possibility of constructing small cheap lines, we desire to make them aware of the fact that there is a railway of that kind already in existence, and realising the wishes of its projectors.

The Festiniog Railway, as this Lilliputian line is called, was constructed at a period when very few of the great lines in England had been commenced, or locomotive improvements introduced. An

act was obtained in 1832 for constructing a railway or tramway with a gauge of only *two feet*, to convey slates from the quarries at Festiniog, Merionethshire, North Wales, down to a shipping-place at Portmadoc. It started from near Dinas, went along the Traeth Mawr, and descended seven hundred feet in a length of seventeen miles. During a period of many years, the traffic was conducted in the following manner: A train was made up of fifty or sixty small wagons or trucks, laden with slates; this descended by the force of gravity, regulated by breaks. There were no locomotives, and no fixed steam-engines working ropes; and therefore the return trains *up* the slope had to be managed by other means. These trains were drawn up by horses: some of the trucks being empty; others carrying coal, machinery, furniture, materials, tools, &c. from Portmadoc up to the quarries. The gauge was made only two feet, in order that the constructive works and the rolling-stock might be as economical as possible. The average gradient was about 1 in 90, some parts, however, being much more steep. Some of the curves were as sharp as two chains' radius. When the population and trade had considerably increased throughout the district, inquiries were made as to the possibility of rendering the railway available for passengers as well as for slates and other quarry produce. The necessary changes were completed about the year 1865, and were described somewhat fully by Captain Tyler, government inspector of railways. Further alterations have been made since; but the main features are simply as follows.

Improvements were made in the permanent way, while some of the gradients and curves were rendered less severe. The rails are light, weighing about thirty pounds to the yard; and are supported by cast-iron chairs, thirteen pounds weight at the joints, ten pounds weight midway between the joints, placed on transverse larch sleepers. Very small locomotives were expressly constructed for the service by Mr England. Each locomotive has two pair of wheels coupled together, two feet diameter, and five feet apart from centre to centre. The cylinders, outside the framing, are eight inches diameter, with twelve inches length of stroke, and are raised only about six inches above the level of the rails. The maximum working-pressure is two hundred pounds on the square inch. The water is contained in tanks surrounding the boiler, and the coal in a small four-wheel tender. There is a safety-guard, like a snow-plough, to remove obstructions: suggested by the fact that the locomotives and all the rolling-stock are so little elevated above the level of the rails. The locomotives, which weigh $7\frac{1}{2}$ tons in full working order, cost about nine hundred pounds each.

The passenger-carriages are 10 feet long, $6\frac{1}{2}$ feet wide, and $6\frac{1}{2}$ feet high. They run upon four wheels eighteen inches diameter, and four feet apart from the centre of the front axles to those of the rear. Of course, the *transverse* distance apart, in the wheels of locomotives and vehicles alike, is the same as the gauge of the rails, two feet; and the vehicles can only be made roomy enough by projecting considerably beyond the rails. The passengers sit back to back along the middle of the carriage, in order that as much of the weight as possible should come within the gauge of the rails; there is room for ten passengers, five on each seat.

Buffers and couplings are made central. A few cars were made for summer traffic, open overhead and at the sides, a guard-strap being placed in front of each row of passengers. The steepest of the gradients now worked by these tiny-gauge engines and carriages is about 1 in 60. The trains are made up in a singular way. In ascending, the engine goes first, then any goods or merchandise that the cargo may comprise, then the passenger-carriages, and lastly, the empty slate-wagons. In descending, the laden slate-trucks go first, then a few (if any) empty trucks, then the tender, then the engine, then the break-van, and lastly, the passenger-carriages—not all coupled together, but some parts so managed as to take advantage of the descensive force of gravity. A speed of six to ten miles an hour is maintained. In going up the incline, each locomotive could take up fifty tons of trucks and goods; but, from the special nature of the traffic, the slates brought down weigh much more than the passengers and goods carried up. There is, however, a jumping motion experienced whenever the speed exceeds a low limit, owing to the narrowness of the wheel base.

Captain Tyler has called attention to the advantages of an economical narrow gauge, in circumstances where the ordinary gauge of 4 feet $8\frac{1}{2}$ inches would be too costly. With a narrower gauge—lighter rails and sleepers, less ballasting, and cheaper works generally, might be adopted; sharper curves might be laid down; very steep gradients, particularly in mountainous regions, might be more cheaply managed; and lighter engines with lighter vehicles might be made to do all the work, where high speed is not demanded, and where the traffic is not heavy. Whether the gauge be 2 feet, $2\frac{1}{2}$ feet, or 3 feet, there can be no question that a system of branch lines, costing much less than our ordinary railways, and maintained and worked at a much smaller annual expense, would be a great benefit in many parts of the United Kingdom, as well as in the colonies and in India. Many are the districts which yearn for a railway, both for passenger and for goods traffic, but which could not possibly yield an adequate return to the shareholders of such lines as we have unfortunately been in the habit of constructing.

The disadvantage of attempting narrow branch lines from the regular railways would, of course, be a necessary shifting of goods and passengers at the junction. But at present is there not a shifting into carts, omnibuses, and other vehicles? In some of the smaller British islands, also in the Highlands, a railway of humble gauge would be hailed as a blessing, and would suit the financial capacity of such places. 'The Duke of Sutherland, it is well known,' says a London newspaper, 'is a high admirer of the narrow and light railway system; and when last in the north he spent some time in considering the feasibility of its application to the circumstances of Caithness. If ever railway communication is to be largely extended to the more sparsely inhabited and mainly agricultural districts both of Scotland and England, it is certain that it must be by means of the narrow gauge and light permanent way. The experience of lines already made on the old system through such districts speaks too plainly to admit of the anticipation that capital can be procured for kindred enterprises. But the narrow gauge is a more modest

undertaking altogether, while providing quite sufficient accommodation for the wants of such districts as we have alluded to. Sutherland and Caithness present specially eligible fields for the experiment, if indeed it is fair to style the system an experiment after the experience of the Festiniog line. Unfortunately, as regards the former county, it is too late, although there is no little triumph to the advocates of the system in the Duke of Sutherland's avowal, that if he had known its merits earlier he would have adopted it, and saved himself an expenditure of £100,000. With regard to the so-called Dingwall and Skye Railway (expected to be open for traffic in the present summer), if it pays on the 4 feet 8½ inch gauge, it will in all respects be gratifying. But the line will end on the south shore of Loch Carron, and will leave a large region of Inverness and Ross counties still unsupplied, which no company would venture to fill up on the regular gauge, but which might possibly come within the humble scope of the Festiniog system.

It may be mentioned that the Norwegian government have advantageously adopted a gauge of 3½ feet. The first railway constructed in that country was on the English gauge; but the scantiness of the population and trade did not permit it to earn an adequate profit on the cost. Whereupon a narrower gauge was resolved upon for other lines; and there are railways now open and at work on the 3½-foot gauge, from Grandsætt to Hamar (twenty-four miles), Trondjhem to Støren (thirty miles), and Drammen to Randsfjorden (fifty-six miles). Some of the gradients are as steep as 1 in 42, and some of the curves only seven hundred feet radius. Special locomotives for the service were built at Manchester; they weigh about fourteen tons each, with steam up. The total cost of railways, stations, locomotives, rolling-stock, and working-plant of all kinds, has averaged about four thousand five hundred pounds per mile—this, it will be observed, is only *one-seventh* of the English average. The speed is fifteen miles an hour—quite sufficient where trade has not arrived at a high-pressure pitch. The colony of Queensland is also adopting a 3½-foot gauge, under a system planned and superintended by Sir Charles Fox.

A MARINE RESIDENCE.

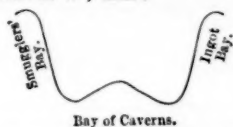
IN SIXTEEN CHAPTERS.—CHAPTER XVI.

THE weather continued very rough and boisterous, and we were fated to see much more of the tyrannous power of ocean over men and ships; but a time was also approaching when we were no longer to contemplate the peril of others, but our own. The incident took place on the very day before we left Boddlecombe, where we had already staid many weeks beyond our appointed time. The place had become very attractive to us, and we were very loath to leave it. 'The very limpets seemed to grow on one,' as Kate observed, in her impassioned style; though if she had taken time to think, she would surely have said the muscles. But notwithstanding that we had explored the locality very thoroughly, there was one spot, called the Bay of Caverns, which we had never yet visited. The reason of this was that it was not approachable by land except at very low spring-tides, though the bays on either hand of it were so. On the west side was the Bay of Ingots; and on

the other, a little cove, in which was a famous cavern called the Smugglers' Hole, which ran inland a great distance in a nor'-westerly direction. This latter was approached by a steep zigzag; and many a time had we visited it, and taken our luncheon therein. On such occasions, our admiration had been always checked by our Boddlecombe friends, by their remarking: 'Oh, that's nothing; you should have seen the Serpent Caves next door.' But 'next door' was, with the exception of about two days per month, continuously under water, and on those days it had so happened that it had hitherto been wet. As the opportunity was now once again afforded to us, we determined therefore not to leave Boddlecombe without visiting its greatest Lion. We had intended to have taken old Michael with us, who had often discoursed respecting this uncomeatable spot; but we did not like to ask him so soon after his great loss to join, even professionally, a party of pleasure. It was the very day after Willie was buried, when half the population of the place had followed the coffin, and all the little ships in harbour had their flags half-mast high. If respect for their lost son could have comforted the ancient pair, their hearts would have been lifted up, or if money could have stanchd their grief, it would have ceased to flow; for a subscription, which was by no means confined to the locality, had assured them a sufficiency for the rest of their lives. But they were both utterly bowed down.

On that very morning, we had passed old Michael on our way, standing very disconsolately on the brink of a stone quarry, leaning on the staff with which he was wont to potter about the shore, and watching the men at work with listless eyes. I shook hands with him, and told him we were going to the Serpent Caves; but he did not offer to accompany us; he only said: 'Remember the tide turns at one o'clock, master,' without even looking towards us or shifting his position.

The position of the spot we were about to visit was, with respect to its sister bays, like the centre of a rough sort of W; thus:



It was much smaller than the other two, and also much more out to sea. But although its area was so limited, it was exceedingly picturesque. Its cliffs were quite perpendicular, except at one spot where a steep path led down to a swift stream, not very fordable anywhere, but across which some good soul had fixed a strong plank, clamped with iron, which permitted you to cross dry-shod at low water. There was not much difficulty in finding the place, and we had a very intelligent guide with us in the person of 'Mossoc.' His admirable young master was engaged in some more lucrative business, but he had sent his dog 'with instructions.' I do not pretend to say how these were communicated; but that dog led the way, as straight as could be, and without any of those skirmishes and excursions in which it is in canine nature to indulge, down to Serpents' Bay; after which he left us to ourselves, and devoted himself to catching crabs.

It was certainly a most curious scene. In the small sandy area enclosed by the cliffs stood up at least a score of huge pinnacles of rock, like ninepins in a skittle-alley, but of various shapes and sizes. One of them was that effigy of Queen Anne of which we had heard much on our first arrival at Boddlecombe; though why it should have been named after that princess in preference to any other female, royal or otherwise, it was difficult to guess. Perhaps, as Eva suggested, the Boddlecombe folk, not knowing that Queen Anne was dead, intended it as a compliment to the reigning sovereign. These pinnacles seemed to be harder than the reddish-coloured soil of the cliff, which was also spotted curiously with green, whence probably the caverns were called *Serpent*, though the rock was not that commonly termed *serpentine*, but much softer. The colours both of cliff and pinnacle shone in that autumn sunshine with a most gorgeous effect, which was heightened by their contrast with the pure white sand. We placed our luncheon upon this spotless carpet, and partook of it in that roofless but painted chamber—more splendid, as more vast, than any eating-room of old Pompeii—before entering the great cavern, which yawned behind us, and which was the chief object of the expedition. Mossoo was in immediate and prompt attendance, and afterwards cleaned the plates. We were in high spirits, and the time passed very rapidly, but I did not lose sight of the fact that we had not much of it to lose.

'Remember,' said I, 'the tide turns at one o'clock, and it is almost that hour, ladies.'

'I thought Michael said "two,"' said Clementina.

The two girls had not heard him, but they took their mother's side in the discussion that followed, because, they said, 'dear Uncle John was by nature fidgety, and always at least an hour before his time.'

Such is the reception which the virtue of punctuality is too apt to meet with from its hereditary enemy—the Female. She never pauses to think of the fifty times she has been saved by her male guardians from just missing trains and steamers; she harps upon the single instance where she had twenty minutes of her valuable time consumed in 'waiting among vulgar people on a horrid platform.'

I was quite positive that Michael had said 'one;' but of course it was vain to argue. I preferred to turn the conversation by remarking how difficult it was to remember such minutiae, and instanced how even Sir Walter Scott, generally so accurate a writer, had failed in this in *Ivanhoe*. When the Templar and the Prior have been misdirected by Wamba in the forest, a dispute arises between them as to whether the jester said *To the left* or *To the right*. The former was, in fact, the direction given, as the Prior affirms; but the knight is characteristically positive to the contrary. Yet, when they afterwards arrive at Cedric's house, it is the Templar who objugates Wamba for directing them falsely, though, according to *his* view, he had directed them aright. So that the novelist not only illustrates the proneness of mankind to differ about such small matters, but corroborates it by his personal example.

This was, I think, as neat a way of avoiding an argument with a lady, as Chesterfield himself could have devised; but it took some time, and was

therefore ill adapted for a bay with a spring-tide running up in it.

'Upon my life,' cried I, rather nervously, when I began to look about me, 'I think the tide must be already on the "turn."'

'What nonsense, John! Why, we have not been here an hour altogether, and we were told we might stop two. It's the lowest spring-tide of the year, you know.'

'Yes, and consequently also the highest: it comes in, they say, like a millrace when it does come.'

'Well, at all events, it will not come in till Two, my dear John; you may take my word for that,' said Clementina positively. For uncompromising assertion is the good soul's weak point. She is not often wrong, but when she is, she is always positive.

'Come along, Uncle John,' cried Kate; 'I've got the candles in my little bag here, and I expect we shall have *such* a treat!'

I had not the heart, or, in fact, the moral courage to say: 'You are all wrong: there is no time to see the caverns; and I insist upon your coming home at once.' But I did run back to the stream, in order to satisfy myself that the tide had not actually turned. And it had not. The foot-bridge stood even a little higher out of the water than when we crossed it. Even if the sea began to flow at once, we should have a few minutes for the purpose we had in view, and yet return dry-footed: it could not take long to see a cave.

Clementina and the girls, with Mossoo, had already passed through the long low entrance, and I hastened after them. A broad fringe of silver sand lay between it and the sea, but the slope was so gradual as to be scarcely perceptible, and I felt that those chafing 'white horses' would come in with headlong speed. I had a great mind to stand watch in hand until the tide did turn, for it only wanted a minute or two of one o'clock, but an impatient chorus of 'Uncle John! Uncle John!' from within the cliff, forbade it. The dear creatures were in ecstasies with the spectacle, and anxious for me to share their pleasure. And, indeed, the *Serpent Caverns* were well worth seeing. Directly you got inside, the roof began to rise, until it attained a marvellous height, so that you might have almost fancied yourself in some dim cathedral, from which a number of little chapels—some so small as to be mere oratories—projected in all directions. Imagine, in fact, a vast outstretched Hand, with the wrist for the Entrance, the palm for the Central Chamber, and the fingers for these outshoots, and you have an excellent plan of the place. As far as the centre, there was light enough from without to mark the colours of the shining walls, which were hard and more slippery than marble, but beyond that was dusk and dark. As we advanced cautiously within, however, and looked back, the whole place (except the chapels) dawned gradually upon us, and afforded a most splendid spectacle. I have had some opportunities of judging the amount of space occupied by men standing close together, and I am sure there was room here for two thousand persons. One could easily imagine them assembled beneath that stately roof for prayer; and how the organ would have pealed within that subterranean temple, we could guess by the thunder of the distant waves which reverberated there. We all acknowledged that in

coming hither on our last day we had kept the *bonne bouche* of our sea-side feast until the last. Then there were the side-chapels and oratories to be explored, all of which required candles, of which Kate (who would have been a most extravagant housekeeper for that 'chief officer,' I think) had brought enough for a week. The cliff was here no longer of the same hard material, but of red sandstone, into which the waves had penetrated with great ease; but the floor, wherever the light fell on it, was the same white sparkling sand throughout, like rock-salt, only here and there was a shallow shining pool, which the last tide had left. The admiration expressed by Kate for one of these, for the first time brought the tide to my remembrance, which, in the contemplation of these wonders, I had clean forgotten. With a flush that I could feel all over my face, and a beating heart, I pulled out my watch, and found it was half-past two. If my ears had not deceived me (and I felt sure they had not), when Michael gave his warning, it was now an hour and a half after low tide.

'My dears,' cried I, 'we have staid here too long. For Heaven's sake, make haste;' and I led the way to the cavern's mouth. The bay was quite covered by the sea, except a little silver rim of sand, along which I ran to catch sight of the stream. A broad, swift river now occupied its place, so deep, that even the handrail of the foot-bridge—which had been its shallowest point—was not to be seen! Utterly unnerved for the moment, I gazed on it aghast with horror.

'Is there any hope, Uncle John?' asked a firm sweet voice beside me. It was Kate, who, always the most active, had come on ahead of the rest, and comprehended our situation at a glance.

'Hush!' said I; 'let us go back.'

But if I intended to spare the others what we saw (for I scarcely knew what I intended), it was too late. Eva was just coming round the point, and uttered a shrill cry of terror. Then Clementina followed. 'My God!' exclaimed she in a hoarse voice, 'I have been the death of my children.'

'No, no, dear mother,' cried the two girls together; 'we were as much to blame as you. It was only Uncle John who was right. You must not fret like that.'

The situation—and no wonder—had overcome even that most excellent and sensible of women, and she wrung her hands like one distraught. I had already run my eyes along the precipitous walls that shut us in on every side; but not a cat could have climbed them anywhere: I had gazed anxiously out to sea, and nothing was to be seen save a distant sail on the horizon. How little did those within her think what was occurring to four unhappy fellow-creatures under these burnished cliffs. The sun was shining on them with full power, and everything looked bright and gay: a long line of gulls, which were occupying the last vantage-ground of sand, were strutting and screaming. Nature seemed so full of light and life, while the Shadow of Death was falling over us.

'If you will take my advice, my dears,' said I as calmly as I could, 'we will go back into the cavern, and see if we can get to any place above the water-line.'

Clementina smiled sadly. 'We will take your advice, Uncle John, now, when I fear it is too late. Would to Heaven I had taken it earlier!'

This touched me deeply, for it was a great con-

cession for a female. Everybody knows, and most men have reason to believe, the story of the lady who would have it that the knife her husband spoke of was a pair of scissors, and who, when drowning, held up her two fingers above water, to shew that she died in that belief. Perhaps, if Clementina had been my wife, she would have still stuck to the two o'clock tide.

The sea had now reached the margin of the cave, and Eva stood close at its mouth, to watch for a boat (in the coming of which I felt secretly convinced lay our only hope), while the rest of us made a close scrutiny within. The Central Chamber did not occupy much of our attention, for though five-sixths of it was out of the reach of the tide, there was scarcely foothold for a fly on any portion of its walls. The side chapels on the western side were shorter than those on the east; and after a careful scrutiny, we had just abandoned them as useless, when an exclamation from Eva caused us to run to her. I noticed on my way how very dim and dusk the large Chamber had become; the sea had already filled up half the aperture of the cavern, and driven in our sentinel.

'Do you see a boat?' cried Clementina anxiously.

'No, dear mother. I am so sorry I cried out; but a big wave frightened me so. And—and—I am sure we are going to be drowned, for the dog has deserted us.'

It was true. The intelligent creature, alarmed at the growing dusk, or instinctively conscious of the coming peril, had dashed through the water into the open.

'I am glad the poor thing is saved,' observed Kate simply.

The generosity of the speech struck us all, but it also reminded us of what rendered it so generous—of our own now certain doom. There was only a little line of light—not above half a foot or so—above the incoming tide.

'Uncle John,' said Clementina with emotion, and laying her hand tenderly on my arm, 'if my obstinacy is fated to be the cause of death to these dear ones, I need not be your murderer also. See; there is still time for you to escape, for you can swim. God bless you for all your past kindness to us.' Then she kissed me tenderly, as did the dear girls also.

'Pray, make haste, Uncle John,' urged they, 'or you will be too late.'

I looked round at the darkening cove, and at the streaks of light that seemed to be beckoning me out into the boundless day, but I do not think that for one single instant the idea of deserting those helpless creatures came into my mind.

'Why should you die with us, John? This is suicide. Besides, you could swim out and get a boat.'

I shook my head. 'No boat could reach us now, my dears, as you well know; and as to diving with you, let us hope we shall all live together still.' But in truth I had no hope of that.

'Go, John, go,' whispered Clementina eagerly. 'Neither God nor man will condemn you.'

'My dear,' whispered I, back again, 'when the captain, Michael spoke of, stuck by his ship because there were women and children in it, not his own people, we agreed he only did his duty: now these girls are of my own flesh and blood.'

Clementina said no more, but silently squeezed my hand. I must here explain that I do not wish

to represent myself in any chivalrous light. I don't think many men would have deserted those poor creatures: and, moreover, the idea of death was perhaps tempered by some vague uncertainty; at all events, it was not *immediate*, as when a vessel strikes a sunken rock, for we had several hours of life before us, and that doubtless makes a great difference.

I am bound to say, too, that the example of Clementina and the girls might have shamed any man into at least the outward show of firmness. I don't think one of them shed a tear. They were very silent—conversing, I have no doubt, with One who can hear man's unspoken prayer as easily as the harmonious thunder of the heavenly choir; but quite sensible and collected. It was too dark now, even in the Central Chamber, to see one another without candlelight, and the roar of the flowing tide within it was truly awful. In one of the pauses of it, Kate exclaimed: 'Mossoo has reached shore; I hear a bark.' As an example of the incongruity of the ideas which occur to one at such a time, I may here mention that I almost replied: 'I wish I could see a bark;' so importunately did that indifferent and inopportune joke rise to my lips, though my heart was full of heaviness and despair.

Of the three caverns to the east, we took the most easterly, because, though all were wet, even to their low roofs, shewing that the tide reached their utmost limit, this seemed to rise a little more than the rest. Having explored it thoroughly, we went back as far as the waves would let us, and then gradually withdrew as they advanced. Presently we found ourselves shut out of the Central Chamber altogether, and confined to this little cave, which was growing narrower and narrower. Then we gathered together and sat down at its extreme end, each with a candle in our hand, quite silent, and, as it were, waiting for Death. It was a weary while, although, indeed, we did not wish it ended. We had been prisoners for nearly four hours by my watch, when our breathing began to grow oppressive; the tide had closed the entrance of our last retreat, and we were using up the air.

Presently Kate whispered: 'Mamma, did you hear *that*—like the stroke of a pick?'

'Yes, my dear, I have heard it many times. Heaven send us help.'

'My dear ones,' said I solemnly, 'do not let us deceive ourselves with false hopes. I have heard the noise you speak of also; but it can only be the closeness of the atmosphere which is affecting our brain and hearing. We are a hundred and fifty feet below the level of the cliff, and if all England were at work upon it they could not save us.'

'God's will be done!' sighed Clementina.

'Uncle John, my feet are so cold,' murmured poor Eva. 'Is that also the want of air?'

'Perhaps so, my darling: come up a little higher, next your mother.'

Eva was sitting rather lower than the rest of us, and the fact was that an advancing wave had covered her feet; though she had fallen into a sort of lethargic state, and took no notice.

'Uncle John,' resumed Kate earnestly, after a short silence, 'unless I have quite lost my senses, I do hear the strokes of a pickaxe. Men are digging for us, and very near. I am positively certain of it. Put your ear here, next the cliff.'

I leaned forward and did so, just to humour her. I had no more hope of such a thing being true than that the tide would abate before its time. Imagine, then, my emotions, when I not only heard a sound as of digging, but a sort of muffled talk—the murmur of men's voices.

'There are men at work in the Smugglers' Hole,' said I; 'they are trying to reach us that way. Let us make all the noise we can, to shew them exactly where we are.'

We all lifted up our voices together, and I struck with my walking-stick against the soft rock. Immediately, an answering knock was given, and the strokes of the picks came quickly and heavily. Those who wielded them well knew how urgent was our need.

We could now breathe only with great difficulty, and the water had more than once come over our feet. But I did my best to second the exertions of those without with the point of my stick, and even the poor women worked with their parasols. It was hopeless to expect that any excavation sufficient for our exit should be made in time, but it was just possible that a hole might be made through which we might get air. And so it happened; for presently we heard a great cry of 'Stand aside within there;' and hardly had we shifted from our places, when the end of the pickaxe—with a gleam of light on it, like the shining sword of a good angel—broke through the cliff, and the next moment we felt fresh air.

It came only just in time; and indeed poor Eva was already so far gone that we had to lift her up to the orifice before she came to herself again; but with every stroke it grew wider, and though the wave was now up to our knees, we could all look out, and behold our preservers.

Mossoo and old Michael had been the immediate cause of this most unlooked-for rescue. The dog's distressed look, as it ran home alone without us, had aroused the old man's suspicions; he had come to the cliff above the bay, and seeing the foot-bridge under water, at once guessed what had happened. It had always been a theory of his, it seems, that the cave called Smugglers' Hole, running north-west, must be but a very little distance from that part of Serpent's Cavern which ran to the north-east, and he had even at one time thought of breaking through the intervening space, so that the latter cavern should be approached at all times independently of the tide. And now the quarrymen were fortunately at hand to put this idea into immediate execution.

It was a most fortunate choice that we had made in selecting the easternmost extremity of the cavern, which happened thus to run so as almost to meet the termination of the Smugglers' Hole, which was dry, and beyond high-water mark—whence it had been used, not so many years ago, by what were euphemistically termed 'the Free-traders,' for storing their goods. In no other part of the Serpent's Cavern could our deliverers have reached us; and when they did so, and had quite broken down the partition of cliff between us, we were still all prisoners together until the tide receded, and permitted us to leave the Hole, and ascend the zigzag.

It was rather a frightful adventure with which to conclude our autumn holiday; but for my part, I am glad that it took place. That common peril, though of but a few hours' duration, has more

endeared our little party, I believe, to one another than could a whole lifetime full of ordinary experiences. How forcibly, too—were one inclined to moralise, did it illustrate the advantage of a kindly and compassionate disposition, since, doubtless, had not Clementina shewed such pity for Michael in his distress, the old man would not have been so quickened with the sense of our peril—as his gratitude caused him to be—by the mere barking of a dog.

The quarrymen told me he seemed to have clean forgotten his private woe in the idea of our perilous position, and could with difficulty be induced to leave the wielding of the picks to their more powerful and skilful arms.

In Michael and his wife at least, we have left two hearty friends in Boddlecombe, and I hope some others. Even the imperturbable Sam shewed some signs of genuine regret at parting. How little we had thought, when we first arrived at No. 1 Bellevue, that we should leave the little seaport town with such regret.

As we drove along the cliff top towards Marjoram Gate, we saw coming round the headland a steam-tug towing behind it the new Lifeboat, that had been already sent to take the place of the gallant *Saveall*. (And I have no doubt that as brave and honest a seaman as Willie Sturt will be found to take that young hero's oar. Thus is the youth and vigour of our lifeboat crews renewed like the sea eagle's.)

THE END.

THE MONTH:

SCIENCE AND ARTS.

AMONG the articles talked about and exhibited at scientific meetings and conversaziones, a new spectroscope by Mr J. Browning is a triumph of constructive art and philosophical principle. The prisms of which it is composed are self-adjusting, moving always in accordance with the telescope to which they are attached, and affording to the observer more facility for investigation than any other instrument of the kind. Those who know anything of spectroscopy are well aware that the difficult parts of the spectrum to examine are the ends; the red rays and the violet rays; but with this new spectroscope they can be readily observed.

Mr Brunton, C.E., has contrived a switch-lock and interlocking signal apparatus for railways, which looks as if it should effectually prevent the accidents occasioned by a train being turned on to a wrong line or a wrong siding. The apparatus comprises a triple system of levers and cranks, but no one of the three can be moved unless the other two are in their proper place: hence a signalman (even should he lose his presence of mind) is prevented from raising the wrong signal, or opening the wrong switch—which is an obvious advantage. Having had much to do with railways in India, Mr Brunton discovered, by painful experience, that the native signalmen were always liable to mistakes, and was thereby led to devise his system.

A pyrometer, or heat-measurer, is an instrument used for measuring very high temperatures, espe-

cially the temperature of furnaces in metal, glass, and pottery works. The pyrometer hitherto used is that known as Wedgwood's, in which the shrinkage of a piece of fireclay indicates the temperature. But this method has never been regarded as satisfactory; and Mr C. W. Siemens, F.R.S., with characteristic ingenuity, has invented what he calls the Electrical Resistance Pyrometer, which is based on a certain peculiarity in the pure metals, that their resistance to the electric current increases with the temperature. He coils a platinum wire of known resistance round a small cylinder of fireclay, and, by a tube or shield of platinum, protects it from the destructive action of the flame of the furnace without preventing access of heat. When the instrument is in operation in a roaring furnace, the resistance of the enclosed wire increases rapidly, and the amount thereof is measured by a compact resistance-measurer specially designed for the purpose by Mr Siemens. This measurer is placed outside the furnace, where it can be easily read off, and is connected with a small Daniell's battery and the pyrometer by wires. The importance of this arrangement to all who work in metals may be judged of from the fact, that it measures accurately the highest temperatures, even to the melting-point of platinum.

In a short paper, by Sir Charles Wheatstone, on a *Cause of Error in Electroscopic Experiments*, read at the Royal Society, the author shews how easy it is for a person making delicate electrical experiments to avoid error. The human body becomes electrical in different degrees according to circumstances, but particularly in a well-warmed room in frosty weather, when walking across the carpet or rubbing it with the feet will charge the body with electricity, and on touching with the finger the electrometer or galvanometer, the needle is seen to make a wide sweep round the dial. Different amounts of deflection may be produced by changes of dress: they are less forcible when worsted stockings are worn than with cotton, and can be made to vary with the material of the boot-sole. Consequently, any one investigating the phenomena of animal electricity must guard very carefully against his own 'personal error,' as astronomers would call it. Even stamping on the carpet, and immediately raising the foot, will produce a movement of the needle over several degrees. The effect can also be shewn when two or more persons join hands; and a clever spirit-rapper might persuade credulous folk that the spirits with their occult influences were at work among the party.

The Institution of Naval Architects have held a series of sittings for despatch of professional business, and to read papers on shipbuilding and allied subjects. Considering the frequent loss of vessels by foundering at sea, a paper *On the Load-draught of Merchant-ships* becomes important; also *On the Influence of Pressure on the Sides of Ships*. Another was, *On a Simple Plan of Applying Zinc in a Fluid State to the Surface of Ships*, which should be worth notice on economical grounds. *The Channel Passage, and International Communication by Railway Steamships*, were discussed; and in a paper *On the Influence of the Suez Canal on Ocean Navigation*, the advantages of that short cut to India were treated of by Mr Samuda.

The Meteorological Office of the Board of Trade, in carrying out their scheme of Ocean Statistics,

from which great advantage may be anticipated to navigation and to meteorological science, have constructed two charts, of which all whose business it is to go down to the sea in ships will appreciate the value. One is a Wind-chart, the other a Current-chart. They include a district of the Atlantic lying between the equator and 10 degrees north, and 20 degrees and 30 degrees west, and contain the results of about five years' observations made during the month of November. In the same way, the prevalent winds and currents for each month of the year are to be shewn; so that at whatever season a vessel may be on her voyage, the captain will be able, by consulting his charts, to choose the route in which he will be likely to find the most favourable wind and current. The advantage will be great, especially in that equatorial belt of calms known among sailors as 'the Doldrums.' The advantage will, of course, be largely increased when similar charts shall have been constructed for every district of the ocean wherever ships sail; and not only commerce and navigation, but physical science, may be expected to benefit by the intimate knowledge that will be obtained of the winds and currents of the globe.

There is rough and heavy work to be done in telegraphy as well as in wire-drawing, and there are lines on which the electrical resistance is greater than others. A new form of secondary battery suited for such cases has been devised by Mr J. Parnell. It has forty cells, each containing a pair of copper-plates immersed in a solution of the impure carbonate of sodium, known familiarly as 'soda.' This employment of an alkali offers manifest advantages. To charge the large battery of forty cells, a small 'Grove' battery of five cells is used. By this the whole series is excited to activity; and whenever their action becomes weak, a few seconds' connection with the small Grove battery will restore the energy.

A particularly interesting paper *On Well-boring and Pumping Machinery*, by Mr W. Mather of Manchester, has been read at a meeting of the Institution of Mechanical Engineers; and as the invention therein described is of great utility, we gladly give a brief account of it. A steam-engine, a flat hemp-rope, a few boring-tools, lifts, and grapnels of various forms, constitute the working apparatus. A hole is bored in the ground in the usual way: then the boring-tool, attached to the end of the rope, is let down, and made to give a succession of blows on the bottom, being turned slightly round between every stroke. In this way, the bottom, whether clay, gravel, chalk, or rock of any kind, is broken and penetrated; the tool is wound swiftly up; the lifting-bucket is hooked on, and speedily brings up the loosened material. There are various contrivances for meeting contingencies; but a general idea of the method of working may be gathered from this brief description. It is a method ingenious in its simplicity, and very effective, and much more expeditious than the former practice of using iron rods, the weight of which at great depths becomes enormous. It was by Mather's machinery that the boring at Middlesbrough, which discovered the existence of large beds of rock-salt and of brine springs in that part of the Vale of Tees, was effected. This boring is 18 inches diameter, and 1312 feet deep, through sandstone, limestone, gypsum, and marl. The time occupied was 540 days, and the number of

men employed, including a smith to sharpen the cutters, never exceeded six. At Norwich, a well 24 inches and 18 inches diameter was sunk 1184 feet, mostly through chalk and flints, at the rate of 1 foot 11 inches per day. At other places in England, on the continent, and in India, similar operations have been carried out. A boring to explore for petroleum is going on in Assam. The Public Works Department in India have three of the machines in use, and many a thirsty town and village will ere long rejoice in abundance of water. Hull affords a striking example of what may be accomplished by deep boring. Three holes were sunk to a depth of 400 feet, and tapped a supply of excellent water, which mounts to the surface, and delivers a copious flow of two million gallons every day for the use of the inhabitants, without pumping.

This machinery can also be used to explore for minerals, as it will bring up a specimen 'core' of every stratum through which it passes. An offer has been made to bore a hole three feet diameter to a depth of four thousand feet in some part of Surrey, to test the theory of deep-lying beds of coal beneath that county; and in the neighbourhood of Moscow, a boring, intended to be three thousand feet deep, is now carried on, night and day, with a view to a permanent supply of good water.

A small book *On the General Principles which should be observed in the Construction of Hospitals*, by Captain Douglas Galton, is well worth reading. By following the instructions and suggestions therein set forth, any one may construct a hospital of any dimensions, from a single room up to fifty or a hundred wards, and would be able to choose the most favourable site, and to adopt the best methods for drainage, lighting, and ventilation. Economy should be studied for important reasons; and on this point Captain Galton's words are worth quoting. 'Do not,' he says, 'build for a long futurity. Buildings used for the reception of sick become permeated with organic impurities, and it is a real sanitary advantage that they should be pulled down and entirely rebuilt on a fresh site periodically.' This being the case, as little money as possible should be spent on ornamental architecture.

A SPRING SKETCH.

A FAIR spring morn it is, so warm and still;
The sun is up, and all is clear and bright,
Save that a steel-blue shade basks on the hill,
A steel-blue haze that is not mist nor light.
Sweet on the ear the teamster's mellow 'gee,'
The click of harrows over stony knolls,
And all the home-life sounds of husbandry,
Break ever and anon. Across the wolds,
A flock of geese in wedge-shaped order wing
To some far feeding-ground; while overhead
Stray teals, late risen from their reedy bed,
Wheel round and round. The healthful airs of spring
Go pulsing past for all; and man and beast
Joy in the fulness of the vernal feast.

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